South Carolina Department of Health
and Environmental Control

GUIDANCE DOCUMENT: INITIAL GROUNDWATER ASSESSMENT

Underground Storage Tank Program
Bureau of Land and Waste Management
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INITIAL GROUNDWATER ASSESSMENT

INITIAL GROUNDWATER ASSESSMENT IMPLEMENTATION

I. **Purpose** - This guidance document outlines the standardized scope of work for an Initial Groundwater Assessment (IGWA). The IGWA should be conducted at sites where a release of petroleum from a regulated underground storage tank (UST) has been confirmed and preliminary information is necessary to categorize the release. The objective of this standardized scope of work is to determine the initial risk classification of the confirmed release by conducting a receptor survey, installing one groundwater monitoring well, and collecting and analyzing one soil and one groundwater sample for petroleum chemicals of concern (CoC).

II. **Standard** - The IGWA is a standardized scope of work; therefore, a work plan should not be submitted to the Department. Upon receiving approval for implementation of the IGWA from the Department, the following scope of work should be completed at the designated site within 60 days or as established by the Department. All site rehabilitation activities must be conducted by a SCDHEC certified site rehabilitation contractor as required by the State Underground Petroleum Environmental Response Bank (SUPERB) Site Rehabilitation and Fund Access Regulations R.61-98. Prior to implementation of site rehabilitation activities related to a release from an UST, all required technical approvals must be obtained from the Department.

III. **Assessment Implementation**

A. Receptor Survey and Site Data

To successfully complete the receptor and utility surveys the contractor shall:

1. Locate all private and public water supply wells (drinking and non-drinking) and other potential receptors (as defined in the South Carolina Risk Based Corrective Action (RBCA) Guidance Document, i.e., utilities, surface waters, wetlands, basements) within a 1,000-foot radius of the site. Document the locations in the Report of Findings and depict the locations on the relevant portion of the appropriate United States Geological Survey 7.5 minute topographic map.

2. Document the current use of the site and adjacent land (residential, commercial, agricultural, industrial, etc.). Identify any UST site(s) within a 500-foot radius of the subject site and provide their UST permit number(s) in the report.

   If receptors are identified, immediately screen for hydrocarbons using a properly calibrated screening device. Water samples shall be obtained and analyzed for the appropriate parameters for all water supply wells and surface water bodies within a 250-foot radius of the site. All municipal supply wells within a 1,000-foot radius shall have a sample collected and analyzed for the appropriate parameters.

   The UST project manager shall be notified at (803) 896-6241 at the earliest opportunity if any water samples are collected within a 1,000-foot radius so the

approved SUPERB cost agreement can be amended. If field-screening indicates the presence of hydrocarbons, notify the UST Project Manager within 48 hours of detection at (803) 896-6241 and provide the name, address, and a contact telephone number for all affected property owners. All field-screening and laboratory data for these receptors shall be included in the report of findings.

B. **Monitoring Well or Boring Installation**

One permanent monitoring well constructed of two-inch diameter PVC casing with a ten-foot length of PVC screen bracketing the water table shall be installed in the area showing the highest concentration of CoC above risk based screening levels as documented from the previous soil and/or groundwater assessment, or at a location specified by the Department. The well must be installed under the direction of a South Carolina Certified Well Driller and in compliance with the South Carolina Standards and Regulations, R.61-71. The well shall require proper filter pack, grout, locking well cap, well pad at or above the land surface, data plate, and a cover held in place with bolts or screws. Any monitoring wells(s) completed in traffic areas should be flush-mounted. All other wells should be completed with a one-foot minimum stick-up casing. The well must be properly developed. The development method shall be capable of removing enough formation cuttings, drilling fluids, and additives to provide relatively sediment-free water samples that are typical of the aquifer. All development water must be containerized and disposed of as appropriate.

During well installation, soil samples are to be collected for screening at five-foot intervals. The soil lithology of each sample is to be recorded on a drilling log. The log shall contain the soil type, color of soil using standard methods, rocks or minerals present, split-spoon sample intervals, and any organic vapor and field screening measurements. Additionally, a qualitative indication of soil conditions (dry, moist, wet, saturated, and for waste oil UST assessments note any staining of the soil) shall be noted on the log. The boring log shall note the depth of each sample submitted for analysis. Enclose the boring log, DHEC Form 1903, and Water Well Record as attachments to the Report of Findings.

C. **Sampling and Analysis**

1) Soil Sample

If groundwater is encountered within 25 feet of the surface, a monitoring well shall be installed. Additional well footage, up to a depth of 50 feet, may be warranted if groundwater is not encountered. If a monitoring well is installed, a soil sample shall also be collected and analyzed for the appropriate parameters. The soil sample with the highest field screening value (above the water table) shall be collected for laboratory analysis. If the field screening for all soil samples within the boring are within ten percent of each other, the sample from the greatest depth collected above the water table shall be submitted for analysis.

If groundwater is not encountered within 50 feet of the surface, the soil sample with the highest field screening value shall be collected for laboratory analysis. If the field screening for all samples within the boring are within ten percent of each other, the sample from the greatest depth above the water table shall be submitted for analysis. Refer to Analytical Methodology for Groundwater and Soil Assessment Guidelines for collection and preservation methods as well as analytical parameters required for this scope of work. The boring shall be properly abandoned per the South Carolina Well Standards and Regulations, R. 61-71.I.3.d.

2) Groundwater sample.

A groundwater sample should be collected after the well has been developed and allowed to equilibrate for a minimum of 24 hours or until the groundwater returns to pre-drilling conditions. (Reference the EPA Standard Operational Procedure and Quality Assurance Manual (EISOPQAM).

Report the thickness of any free phase product as follows: Record the distance from the top of casing to the top of the free product; record the distance from the top of casing to the product-water interface; record the difference as the thickness of free product. The collection of a ground-water sample is not necessary if the thickness of free phase product exceeds 0.01 foot (1/8 in.).

If free product is not encountered, the well shall be properly purged prior to sampling and the pH, temperature, dissolved oxygen and specific conductance reported.

Analyze groundwater and soil samples for the following parameters.

Groundwater	**Soil**
Benzene Toluene Ethylbenzene Xylenes Naphthalene Methyl tertiary butyl ether (MTBE) Polynuclear Aromatic Hydrocarbons (PAHs) Filtered lead Ethylene Dibromide (EDB) 1,2-DCA	Benzene Toluene Ethylbenzene Xylenes Naphthalene Methyl tertiary butyl ether (MTBE) Polynuclear aromatic hydrocarbons (PAHs) Total lead
Waste Oil Groundwater	**Waste Oil Soil**
Benzene Toluene Ethylbenzene Xylenes Naphthalene Methyl tertiary butyl ether (MTBE) Polynuclear aromatic hydrocarbons (PAHs) Filtered lead Ethylene Dibromide (EDB) 1,2-DCA 8 RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver)	Benzene Toluene Ethylbenzene Xylenes Naphthalene Methyl tertiary butyl ether (MTBE) Polynuclear aromatic hydrocarbons (PAHs) Total lead 8 RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver)

A laboratory that is certified by DHEC for the relevant analysis must perform all laboratory analyses. Approved methods of analysis are provided in the Analytical Methodology for Groundwater and Soil Assessment Guidelines. The elapsed time between the collection date of the groundwater samples and the received date of the report will be no more than 60 days.

D. **Water and Soil Disposal**

All soil, development water, and any purge water generated during assessment implementation shall be temporarily stored in 55-gallon drums or a similar container. Upon receipt of laboratory analytical results, the soil and/or water shall be properly disposed in the appropriate manner. Soil and water disposal manifests shall be included in the IGWA Report as Appendix D.

IV. ASSESSMENT REPORT

The assessment findings shall be provided to the Department in the Initial Groundwater Assessment Report. The format for the report is provided in this document following this section. The report format also may be provided on a disc or hard copy. Contact the Department at (803) 896-6241 and ask to have this guidance document provided to you.

Introduction

- Facility name, address, telephone number, and UST Permit number
- Name, address, and telephone number of the UST owner and operator
- Name, address, and telephone number of the property owner
- Name, address, telephone number, and DHEC UST certification number of the contractor that completed the IGWA
- Name, address, telephone number, and the certification number of the well driller that installed the boring/monitoring well

Receptor Survey and Site Data

Please refer to Section III.A of the IGWA Guidance Document for information required to complete the receptor survey and site data.

Soil and Monitoring Well Information

- Describe the primary soil type and field screening results and attach the well drilling log.
- Provide the monitoring well installation and development date(s).
- Describe the well development procedure.
- Depict on the map where the monitoring well was installed and the justification for the location.
- Provide the soil analytical data in space provided on the report form.
- Describe how the soil sample was collected (e.g. two encore samplers and one four ounce jar) and preserved.

Groundwater Data

- Indicate the depth to groundwater.
- Describe the groundwater sampling methodology and provide the date sampled. Include groundwater measurements (temperature, pH, dissolved oxygen, specific conductance.)
- Describe the purging methodology and provide the volume of water purged and groundwater measurements to verify that purging is complete.
- If free product is present, provide the thickness.
- Present the groundwater analytical data in the space provided on the Report Form. Laboratory data from any water supply wells or surface water bodies shall be summarized in a tabular form. Attach all laboratory data as Appendix B.

Appendices

The appendices required for the report are as follows.

Appendix A. Well Construction Log

The monitoring well construction log must include all information as outlined in the S.C. Well Standards and Regulations R.61-71.H.1.f. Attach a copy of the SCDHEC Form 1903, Water Well Record.

Appendix B. All Laboratory Data

Provide the complete laboratory report including, but not limited to, field sampling logs, chain of custody forms, and all certificates of analyses.

Appendix C. Maps

Topographic Map with site location marked - This must be a United States Geologic Survey 7.5 minute quadrangle with the site and pertinent receptors marked.

Site Base Map - The site base map shall be accurately scaled, but does not need to be surveyed. The map shall show the following:

- Legend including the facility name and address, UST Permit number and a bar scale.
- North arrow.
- Location of property lines.
- Streets or highways (indicate names and numbers).
- Location of buildings.
- Paved areas on or adjacent to site.
- Location of all present and former above ground and underground storage tanks and associated lines, pumps, and dispensers.
- Underground and aboveground utilities on or adjacent to site (sewer, water, telephone, gas, electric, etc.).
- Location of any other potential receptors.
- Previous soil sampling locations.
- Boring/Monitoring well location.

Appendix D. Soil and/or Water Disposal Manifests

Provide a copy of all disposal manifests.

Appendix E. Additional Data

If groundwater wells or surface water bodies within a 250-foot radius or municipal supply well within 1,000 ft radius of the site were sampled, include names, addresses, and phone numbers of the property owner(s).

INITIAL GROUNDWATER ASSESSMENT REPORT

Facility Name_____

Facility Address_____

Facility Telephone Number_____

UST Permit Number_____

UST Owner and Operator's Name_____

Address_____

Phone Number_____

Property Owner's Name_____

Address_____

Phone Number_____

Contractor_____ Cert. # _____

Address_____

Phone Number_____

Well Driller_____ Cert. #_____

Address_____

Phone Number_____

Receptor and Site Data

Please place a check in the appropriate answer block for each question:

Receptor Survey Questions	No	Yes *
Are any drinking water supply wells (public or private) or surface water supply intakes within 1000 feet of the UST?		
Are irrigation or other non-drinking water wells located within 1000 feet of the UST?		
Are other potential receptors (i.e., utilities, surface waters, wetlands) less than 500 feet from the UST?		

* If "yes" provide additional information below:

_____

_____

Were any water supply wells or surface waters within 250 ft. sampled?

Yes _____No _____(Show on site base map)

Is a public water supply line in the area? Yes _____No _____(Show on site base map)

Is the current use of the facility and surrounding properties commercial, residential, agricultural or industrial?

Site: _____

Adjacent Properties:
North: _____
East: _____
South: _____
West: _____

Soil and Boring/Monitoring Well Data

Primary Soil Type: _____

Well Installation Method and Date: _____

Development Method and Date: _____

Soil Sample obtained from _____feet.

SOIL ANALYTICAL DATA

Benzene (μg/kg)	Toluene (μg/kg)	Ethylbenzene (μg/kg)	Xylenes (μg/kg)	Naphthalene (μg/kg)	MTBE (μg/kg)

Benzo(a)-anthracene (μg/kg)	Benzo(b)-fluoranthene (μg/kg)	Benzo(k)-fluoranthene (μg/kg)	Chrysene (μg/kg)	Dibenz(a,h) anthracene (μg/kg)	Total PAH (μg/kg)	Lead (μg/kg)

*For waste oil UST releases only:

Chromium* (μg/kg)	Mercury* (μg/kg)	Selenium* (μg/kg)	Silver* (μg/kg)	Arsenic* (μg/kg)	Barium* (μg/kg)	Cadmium* (μg/kg)

Include Laboratory Data and Chain of Custody Form in Appendix B.

Groundwater Data

Depth to Groundwater: _____ Depth to FP, if present:_____

Free Product Thickness: _____

Well Purging/Sampling Method: _____

Date Sampled: _____

Equilibrated values: Temperature:_____ pH: _____

Dissolved Oxygen:_____Specific Conductance: _____

Soil/Water Disposal Method:_____

Include in Appendix D. Costs for work cannot be compensated without manifest.

GROUNDWATER ANALYTICAL DATA

Benzene (μg/l)	Toluene (μg/l)	Ethylbenzene (μg/l)	Xylenes (μg/l)	MTBE (μg/l)	EDB (μg/l)	Naphthalene (μg/l)

Benzo(a)-anthracene (μg/l)	Benzo(b)-fluoranthene (μg/l)	Benzo(k)-fluoranthene (μg/l)	Chrysene (μg/l)	Dibenz(a,h) anthracene (μg/l)	Total PAH (μg/l)	Lead (μg/l)

*For waste oil UST releases only:

Chromium* (μg/l)	Mercury* (μg/l)	Selenium* (μg/l)	Silver* (μg/l)	Arsenic* (μg/l)	Barium* (μg/l)	Cadmium* (μg/l)

Include Laboratory Data and Chain of Custody Form in Appendix B.

Report Completed By (Print Name): _____

Signature : _____

DHEC Contractor Certification #_____ Date: _____

Appendices

The appendices required for this report are as follows:

Appendix A. Well Construction Log
Appendix B. Laboratory Data
Appendix C. Maps (Topographic and Site Base)
Appendix D. Disposal Manifest(s). (Must be included for payment from SUPERB)
Appendix E. Additional Data (Property owner name, address, phone number for any water supply wells or surface water bodies sampled.)